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Using Hot Insert for UltraSite EDGE BTS

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Contents

Summary of changes

1 Overview

1.1 Features and benefits

The Hot Insert feature allows you to remove and install BTS units without powering off the BTS. Use this feature to:

- Replace a faulty unit
- Increase capacity of a GSM BTS
- Increase capacity of a GSM/EDGE BTS
- Add EDGE capacity to a GSM BTS

1.2 Using Hot Insert

Hot Insert can be used with an UltraSite EDGE BTS when:

- Replacing a faulty unit
- Adding TRXs to upgrade the BTS

These procedures apply to BTS SW CX4.0-3 or later and are explained on the following pages.

Hot Insert can be used with the following units:

- Transceiver Baseband unit, GSM (BB2A)
- Transceiver Baseband unit, GSM/EDGE (BB2E)
- Transceiver Baseband unit, GSM/EDGE (BB2F)
- Dual Variable Gain Duplex Filter unit (DVxx)
- Receiver Multicoupler unit - 2-way (M2xA)
- Receiver Multicoupler unit - 6-way (M6xA)
- Remote Tune Combiner (RTxx)

- Transceiver RF unit, GSM (TSxA)
- Transceiver RF unit, GSM/EDGE (TSxB)
- Wideband Combiner unit (WCxA)

Note

Nokia UltraSite EDGE BTS only supports the Hot Insertion feature for the units listed above.

2 Replacing a faulty unit

Separate Hot Insert procedures are provided for:

- Replacing a TSxx or BB2x unit (non-hopping or RF hopping)
- Replacing a DVxx, MxxA, RTxx, or WCxA unit (non-hopping or RF hopping)
- Replacing a TSxx or BB2x unit (BB hopping)
- Replacing a DVxx, MxxA, RTxx, or WCxA unit (BB hopping)

2.1 Replacing a TSxx or BB2x unit (non-hopping or RF hopping)

Before you start

Review *Overview* at the start of this document.

Review *Replacing UltraSite EDGE BTS units* and *Replacing UltraSite EDGE BTS GSM/EDGE units* in *Nokia UltraSite EDGE BTS Product Documentation*. Pay careful attention to all warnings and cautions.

Note

This Hot Insert procedure is not recommended for use when replacing GSM HW with GSM/EDGE HW.

Steps

1. Ensure the replacement unit is removed from the shipping container.
2. If using BTS SW CX4.0-3, ensure the Nokia BTS Manager is disconnected from the BTS.

3. Lock the affected TRX(s) at the BSC (ZERS).
4. Remove the TSxx or BB2x unit from the BTS cabinet.
5. Install the replacement TSxx or BB2x unit and re-connect cables.
6. Verify that the replaced TRX(s) have reached the Configuring state, which is indicated by the relevant BB2x unit LED(s) flashing yellow.
7. Unlock the TRXs at the BSC (ZERS).
8. Run the TRX tests for the replacement unit:
   a. If using BTS SW CX4.0-3, ensure the Nokia BTS Manager is disconnected from the BTS. Run the TRX test from the BSC (ZUBS, ZUBP).
   b. If using BTS SW CX4.0-4 or later, run the TRX test either from Nokia BTS Manager or from the BSC.

2.2 Replacing a DVxx, MxxA, RTxx, or WCxA unit (non-hopping or RF hopping)

Before you start

Review *Overview* at the start of this document.

Review *Replacing UltraSite EDGE BTS units* and *Replacing UltraSite EDGE BTS GSM/EDGE units* in *Nokia UltraSite EDGE BTS Product Documentation*. Pay careful attention to all warnings and cautions.

Steps

1. Ensure the replacement unit is removed from the shipping container.
2. If using BTS SW CX4.0-3, ensure the Nokia BTS Manager is disconnected from the BTS.
3. Lock the TRXs associated with the affected unit at the BSC (ZERS).
4. Remove the DVxx, MxxA, RTxx, or WCxA unit from the BTS cabinet.
5. Install the replacement DVxx, MxxA, RTxx, or WCxA unit and re-connect cables.
6. Unlock the TRXs at the BSC (ZERS).

7. Run the TRX tests for all TRXs connected to the replacement unit:
   a. If using BTS SW CX4.0-3, ensure the Nokia BTS Manager is disconnected from the BTS. Run the TRX test from the BSC (ZUBS, ZUBP).
   b. If using BTS SW CX4.0-4 or later, run the TRX test either from the Nokia BTS Manager or from the BSC.

2.3 Replacing a TSxx or BB2x unit (BB hopping)

Before you start

Review *Overview* at the start of this document.

Review *Replacing UltraSite EDGE BTS units* and *Replacing UltraSite EDGE BTS GSM/EDGE units* in *Nokia UltraSite EDGE BTS Product Documentation*. Pay careful attention to all warnings and cautions.

Note

This Hot Insert procedure is not recommended for use when replacing GSM HW with GSM/EDGE HW.

Steps

1. Ensure the replacement unit is removed from the shipping container.
2. If using BTS SW CX4.0-3, ensure Nokia BTS Manager is disconnected from the BTS.
3. Lock the affected BTS sector at the BSC (ZEQS).
4. Remove the TSxx or BB2x unit from the BTS cabinet.
5. Install the replacement TSxx or BB2x unit and re-connect cables.
6. Verify that the replacement TRX(s) have reached the Configuring state, which is indicated by the relevant BB2x unit LED(s) flashing yellow.
7. Temporarily set the BTS sector to non-hopping mode to allow the TRX tests to be completed (ZEQE, HOP=N).
8. Temporarily set BTS sector to Cell Barred to prevent customer calls (ZEQF, BAR=Y).
9. Unlock the BTS sector at the BSC (ZEQS).

10. Run TRX tests for the replacement unit:
    a. If using BTS SW CX4.0-3, ensure Nokia BTS Manager is disconnected from the BTS. Run the TRX test from the BSC (ZUBS, ZUBP).
    b. If using BTS SW CX4.0-4 or later, run the TRX test either from the Nokia BTS Manager or from the BSC.
11. Lock the BTS sector at the BSC (ZEQS).
12. Set the BTS sector to BB hopping mode (ZEQE, HOP=BB).
13. Clear Cell Barred for the BTS sector (ZEQF, BAR=N).
14. Unlock the BTS sector at the BSC (ZEQS).

2.4 Replacing a DVxx, MxxA, RTxx or WCxA unit (BB hopping)

Before you start

Review *Overview* at the start of this document.

Review *Replacing UltraSite EDGE BTS units* and *Replacing UltraSite EDGE BTS GSM/EDGE units* in *Nokia UltraSite EDGE BTS Product Documentation*. Pay careful attention to all warnings and cautions.

Steps

1. Ensure the replacement unit is removed from the shipping container.
2. If using BTS SW CX4.0-3, ensure Nokia BTS Manager is disconnected from the BTS.
3. Lock the affected BTS sector at the BSC (ZEQS).
4. Remove the DVxx, MxxA, RTxx, or WCxA unit from the BTS cabinet.
5. Install the replacement DVxx, MxxA, RTxx or WCxA unit and re-connect cables.
6. Temporarily set the BTS sector to non-hopping mode to allow the TRX tests to be completed (ZEQE, HOP=N).
7. Temporarily set the BTS sector to Cell Barred to prevent customer calls (ZEQF, BAR=Y).
8. Unlock the BTS sector at the BSC (ZEQS).

9. Run the TRX tests for all TRXs connected to the replacement unit:
    a. If using BTS SW CX4.0-3, ensure Nokia BTS Manager is disconnected from the BTS. Run the TRX test from the BSC (ZUBS, ZUBP).
    b. If using BTS SW CX4.0-4 or later, run the TRX test either from Nokia BTS Manager or from the BSC.
10. Lock the BTS sector at the BSC (ZEQS).
11. Set the BTS sector to BB hopping mode (ZEQE, HOP=BB).
12. Clear Cell Barred for the BTS sector (ZEQF, BAR=N).
13. Unlock the BTS sector at the BSC (ZEQS).

3 Upgrading the BTS

You can upgrade the BTS using Hot Insert for the following reasons:

- Install additional GSM HW to increase the capacity of a GSM BTS
- Install additional GSM/EDGE HW to increase the capacity of a GSM/EDGE BTS
- Install additional GSM/EDGE HW to add EDGE capacity to a GSM BTS

Separate Hot Insert procedures are provided for:

- Upgrading the BTS (non-hopping or RF hopping)
- Upgrading the BTS (BB hopping)

Before starting either of these procedures, follow the checks outlined in *Preliminary checks for upgrading the BTS.*

3.1 Preliminary checks for upgrading the BTS

Before proceeding with the BTS upgrade, check the following points:

- Power Supply requirements
  - If additional Power Supply unit(s) (PWSx) are required, these must be added before starting the Hot Insert procedure to upgrade the BTS.
  - Support items related to the additional power supply requirements may also need to be upgraded, including:

    Circuit breakers
    Rectifiers
    Site cooling capacity

- Capacity requirements for Abis interface
  - Check the total Abis capacity required for traffic channels, signalling links and Dynamic Abis Pools in the final configuration.
  - If necessary, reduce the data rate of the existing signalling links (D-channels) and/or increase the available Abis capacity to allow for the BTS upgrade.

- Capacity requirements for internal D-bus
  - Check the total D-bus capacity required for traffic channels and signalling links in the final configuration to ensure the capacity does not exceed the 2Mbps limit of the internal D-bus.
  - If necessary, reduce the data rate of the existing signalling links (D-channels) to allow for the BTS upgrade.

- 'Working SDCCH channel ratio'
  - Ensure that the ratio:

    (SDCCH channels)/(Traffic channels)

    for the upgraded configuration remains below the alarm threshold (Alarm 7712).
  - If necessary, allocate more SDCCH channel capacity to the BTS sector during the upgrade process.

3.2 Upgrading the BTS (non-hopping or RF hopping)

Before you start

Review *Overview* at the start of this document.

Review *Installing the units of UltraSite EDGE BTS* in *Nokia UltraSite EDGE BTS Product Documentation*. Pay careful attention to all warnings and cautions.

If the added TRXs will be enabled for EGPRS, then review the document *EGPRS implementation guide for GSM/EDGE BSS.*

Note

This Hot Insert procedure is not recommended for use when replacing GSM HW with GSM/EDGE HW.

Summary

The following procedures are necessary for upgrading a non-hopping or RF hopping BTS sector:

- Creating new TRXs at BSC
- Adding new units to BTS cabinet
- Enabling added TRXs on network
- Testing added TRXs
- Applying optional settings

3.2.1 Creating new TRXs at BSC

1. Create TRXSIG D-channels at the BSC for the additional TRXs (ZDSE) and set these to WO state (ZDTC).
2. If EGPRS will be enabled for the added TRXs, then:
   - Temporarily lock the BTS sector at the BSC (ZEQS).
   - Temporarily disable GPRS for the BTS sector (ZEQV, GENA=N).

   This action allows the new TRXs to be created with a Dynamic Abis Pool (DAP) attached for EGPRS operation.
3. Create new TRXs at the BSC (ZERC). Leave them in a Locked state.
4. If EGPRS will be enabled for the added TRXs, then :
   - If EDGE TRXs and non-EDGE TRXs exist in the same BTS sector, set the TRX parameters for correct operation (ZERM, GTRX=Y/N and PREF=P/N).
   - Enable GPRS and EGPRS for the BTS sector (ZEQV, GENA=Y and EGENA=Y).
   - Unlock the BTS sector at the BSC (ZEQS).

3.2.2 Adding new units to BTS Cabinet

1. Ensure the units required for upgrade are removed from the shipping containers.
2. If using BTS SW CX4.0-3, ensure the Nokia BTS Manager is disconnected from the BTS.
3. Add any non-TRX units (such as DVxx, MxxA, RTxx, and WCxA) and additional cabling to the BTS cabinet.
4. Add BB2 and TSxx units to the UltraSite cabinet, as required, and connect cables.
5. Using Nokia BTS HW Configurator, create a new HW configuration, open a saved configuration, or use the currently active configuration. Then, send the BTS configuration to the BTS.
6. Allocate Abis connections for the additional TCHs and TRXSIGs using Traffic Manager in Nokia BTS Manager or Nokia UltraSite BTS Hub Manager.
7. Verify that the added TRXs have reached the Configuring state, which is indicated by the BB2x unit LEDs (for the added TRXs) flashing yellow.
8. Temporarily connect Nokia BTS Manager to the BTS and select ‘Update Abis allocations’ from the Tools menu.
9. If using BTS SW CX4.0-3, disconnect the Nokia BTS Manager from the BTS.

3.2.3 Enabling added TRXs on Network

1. Unlock the added TRXs at the BSC (ZERS).

3.2.4 Testing added TRXs

1. Run the TRX test for each added TRX:
   a. If using BTS SW CX4.0-3, ensure the Nokia BTS Manager is disconnected from the BTS. Run the TRX test from the BSC (ZUBS, ZUBP).
   b. If using BTS SW CX4.0-4 or later, run the TRX test either from the Nokia BTS Manager or from the BSC.

3.2.5 Applying optional settings

1. To enable hopping and/or increase SDCCH capacity, if required:
   a. Lock the BTS sector at the BSC (ZEQS).
   b. Set additional SDCCH capacity in the BTS sector, if required (ZERM).
   c. Enable hopping, if required (ZEQE, HOP=BB).
   d. Unlock the BTS sector at the BSC (ZEQS).

3.3 Upgrading the BTS (BB hopping)

Before you start

Review *Overview* at the start of this document.

Review *Installing the units of UltraSite EDGE BTS* in *Nokia UltraSite EDGE BTS Product Documentation*. Pay careful attention to all warnings and cautions.

If the added TRXs will be enabled for EGPRS, then review the document *EGPRS implementation guide for GSM/EDGE BSS.*

Note

This Hot Insert procedure is not recommended for use when replacing GSM HW with GSM/EDGE HW.

Summary

The following procedures are necessary for upgrading a BB hopping BTS sector:

- Creating new TRXs at BSC
- Adding new units to BTS cabinet
- Testing added TRXs
- Enabling added TRXs on network

3.3.1 Creating new TRXs at BSC

1. Create TRXSIG D-channels at the BSC for the additional TRXs (ZDSE) and set these to WO state (ZDTC).
2. Lock the BTS sector at the BSC (ZEQS).
3. If EGPRS will be enabled for the added TRXs, then:
   - Temporarily disable GPRS for the BTS sector (ZEQV, GENA=N).

   This action allows the new TRXs to be created with a Dynamic Abis Pool (DAP) attached for EGPRS operation.
4. Create new TRXs at the BSC (ZERC) and leave them in a Locked state.
5. If EGPRS will be enabled for the added TRXs, then:
   - If EDGE TRXs and non-EDGE TRXs exist in the same BTS sector, set the TRX parameters for correct operation (ZERM, GTRX=Y/N and PREF=P/N).
   - Enable GPRS and EGPRS for the BTS sector (ZEQV, GENA=Y and EGENA=Y).
6. Unlock the BTS sector at the BSC (ZEQS) to allow traffic to continue using the BTS sector during the next stage of the upgrade.

3.3.2 Adding new units to BTS Cabinet

1. Ensure the units required for upgrade are available and unpacked from shipping containers.
2. If using BTS SW CX4.0-3, ensure Nokia BTS Manager is disconnected from the BTS.
3. Add any non-TRX units (such as DVxx, MxxA, RTxx, and WCxA) and additional cabling to the BTS cabinet.
4. Add BB2 and TSxx units to the BTS cabinet, as required, and connect cables.
5. Using Nokia BTS HW Configurator, create a new HW configuration, open a saved configuration, or use the currently active configuration. Then, send the BTS configuration to the BTS.
6. Allocate Abis connections for the additional TCHs and TRXSIGs using Traffic Manager in Nokia BTS Manager or Nokia UltraSite BTS Hub Manager.
7. Verify that the added TRXs have reached the Configuring state, which is indicated by the BB2x unit LEDs (for the added TRXs) flashing yellow.
8. Temporarily connect Nokia BTS Manager to the BTS and select ‘Update Abis allocations’ from the Tools menu.

9. If using BTS SW CX4.0-3, disconnect Nokia BTS Manager from the BTS.

3.3.3 Testing added TRXs

1. Lock the BTS sector at the BSC (ZEQS).
2. Temporarily set the BTS sector to non-hopping mode to allow the TRX tests to be completed (ZEQE, HOP=N).
3. Temporarily set the BTS sector to Cell Barred to prevent customer calls (ZEQF, BAR=Y).
4. Unlock the added TRXs at the BSC (ZERS).
5. Unlock the BTS sector at the BSC (ZEQS).
6. Run the TRX test for each added TRX:
   a. If using BTS SW CX4.0-3, ensure the Nokia BTS Manager is disconnected from the BTS. Run the TRX test from the BSC (ZUBS, ZUBP).
   b. If using BTS SW CX4.0-4 or later, run the TRX test either from Nokia BTS Manager or from the BSC.

3.3.4 Enabling added TRXs on Network

1. Lock the BTS sector at the BSC (ZEQS).
2. Set the BTS sector to BB hopping mode (ZEQE, HOP=BB).
3. Clear Cell Barred for the BTS sector (ZEQF, BAR=N).
4. Set additional SDCCH capacity in the BTS sector, if required (ZERM).
5. Unlock the BTS sector at the BSC (ZEQS).

4 Glossary

BB2x	Transceiver Baseband unit • BB2A for GSM • BB2E for GSM or GSM/EDGE • BB2F for GSM or GSM/EDGE
BSC	Base Station Controller
BSS	Base Station Subsystem
BTS	Base Transceiver Station (Base Station)
DVxx	Dual Variable Gain Duplex Filter unit • DVTB for GSM/EDGE 800 • DVTD for GSM/EDGE 800 • DVGA for GSM/EDGE 900 • DVHA for GSM/EDGE 900 customer-specific H band • DVJA for GSM/EDGE 900 customer-specific J band • DVDC for GSM/EDGE 1800 • DVDA for GSM/EDGE 1800 A band • DVDB for GSM/EDGE 1800 B band • DVPA for GSM/EDGE 1900
EDGE	Enhanced Data rates for Global Evolution

GPRS	General Packet Radio Service
GSM	Global System for Mobile communications • GSM 800 GSM 800 MHz frequency band • GSM 900 GSM 900 MHz frequency band • GSM 1800 GSM 1800 MHz frequency band • GSM 1900 GSM 1900 MHz frequency band
HW	Hardware Specifically, electronic equipment supporting data transmission and processing tasks, and the electrical and mechanical devices related to their operation
LED	Light Emitting Diode
M2xA	2-way Receiver Multicoupler unit • M2LA for GSM/EDGE 800/900 • M2HA for GSM/EDGE 1800/1900
M6xA	6-way Receiver Multicoupler unit • M6LA for GSM/EDGE 800/900 • M6HA for GSM/EDGE 1800/1900
PWSx	AC/DC Power Supply unit • PWSA for 230 VAC input • PWSB for -48 VDC input • PWSC for +24 VDC input
RF	Radio Frequency

RTxx	Remote Tune Combiner RTGA for GSM/EDGE 900 RTHA for GSM/EDGE 900 H band RTJA for GSM/EDGE 900 J band RTDC for GSM/EDGE 1800 RTDA for GSM/EDGE 1800 A band RTDB for GSM/EDGE 1800 B band RTPA for GSM/EDGE 1900
RX	Receiver; Receive
SDCCH	Stand-alone Dedicated Control Channel
SW	Software
TCH	Traffic Channel
TRX	Transceiver
TRXSIG	TRX Signalling
TSxx	Transceiver (RF unit), specific to Nokia UltraSite EDGE Base Station • TSTB for GSM/EDGE 800 • TSGA for GSM 900 • TSGB for GSM/EDGE 900 • TSDA for GSM 1800 • TSDB for GSM/EDGE 1800 • TSPA for GSM 1900 • TSPB for GSM/EDGE 1900
TX	Transmitter; Transmit

WCxA	Wideband Combiner, specific to Nokia UltraSite EDGE Base Station • WCGA for GSM/EDGE 800/900 • WCDA for GSM/EDGE 1800 • WCPA for GSM/EDGE 1900